

Notice of Allowability	Application No.	Applicant(s)	
	10/553,842	MIYAKE ET AL.	
	Examiner	Art Unit	
	Quyen P. Leung	2874	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☐ This communication is responsive to _____.
2. ☒ The allowed claim(s) is/are 1 and 2.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|---|--|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____. |
| 3. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date <u>3/16/2007</u> | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____. |


 Quyen P. Leung
 Primary Patent Examiner
 Group Art Unit 2874

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

The application has been amended as follows:

In claim 2 line 5 the limitation "the condenser" has been changed to --the light source--, because the condenser lacked proper antecedent basis.

Note that Applicant discloses and claims the two disclosed embodiments: claim 1 drawn to the first embodiment which relates to an optical transmission device comprising a condenser being (optically) connected to a photonic crystal fiber and claim 2 drawn to the second embodiment which relates to an optical transmission device comprising a light source being (optically) connected to a photonic crystal fiber. In applicant's specification (reference is made to the US Patent Application Publication 2007/0041689 A1) paragraphs [0008-0013] speaks to the first embodiment and paragraphs [0014-0019] to the second embodiment. Specifically, see paragraph [0015] for support for the amendment above.

The following is an examiner's statement of reasons for allowance:

Re claim 1, the cited prior art fail to teach or fairly suggest, separately or in combination, an optical transmission device comprising:

a condenser which gathers signal light; and

a photonic crystal fiber which is (optically) connected to the condenser and includes **a solid core** which constitutes the center of the fiber and a cladding which surrounds the core and has a plurality of holes for transmitting the signal light from the condenser through the core, wherein

the holes of the cladding are sealed at an end portion of the photonic crystal fiber connected to the (optically) condenser over a predetermined length L from an end face of the fiber and the length L [μm] of the portion of the photonic crystal fiber at which the holes of the cladding are sealed is determined to meet the condition of

$$10 \leq L \leq (D+a)/2\tan[\sin^{-1}(\sin\theta/n)]$$

wherein θ [$^{\circ}$] is an incident angle of the signal light with respect to the photonic crystal fiber, D [μm] is an outer diameter of the photonic crystal fiber, a [μm] is a diameter of the core of the photonic crystal fiber and n is a refractive index of the portion of the photonic crystal fiber at which the holes of the cladding are sealed.

Re claim 2, the cited prior art fail to teach or fairly suggest, separately or in combination, an optical transmission device comprising:

a light source which gathers signal light; and

a photonic crystal fiber which is (optically) connected to the light source and includes **a solid core** which constitutes the center of the fiber and a cladding which

surrounds the core and has a plurality of holes for transmitting the signal light from the light source through the core, wherein

the holes of the cladding are sealed at an end portion of the photonic crystal fiber (optically) connected to the light source and

the length L [μm] of the portion of the photonic crystal fiber at which the holes of the cladding are sealed is determined to meet the condition of

$$10 \leq L \leq (a/2 - d \cdot \tan \theta) / \tan[\sin^{-1}(\sin \theta / n)]$$

wherein θ [$^{\circ}$] is an incident angle of the signal light from the light source with respect to the photonic crystal fiber, d [μm] is a distance between the light source and the end face of the fiber, a [μm] is a diameter of the core of the photonic crystal fiber and n is a refractive index of the portion of the photonic crystal fiber at which the holes after the cladding are sealed.

- Sasaoka et al (JP 2002-323625-A, English-language equivalent US Patent Application Publication 2002/0159734 A1 is referred to hereinafter) relates to a photonic crystal fiber having a hollow core, but fails to teach the photonic crystal fiber having a solid core as presently claimed.
- Sasaoka et al fails to address the light source or the condenser, as claimed. As evidenced by paragraph [0025] Sasaoka envisioned other applications that would not require the light source or the condenser, as claimed, because Sasaoka et al teaches attaching ferrules of connectors to both fiber ends so that the optical fiber can easily be connected to the

same type of optical fiber or to a conventional optical fiber, having no hollow in core or cladding.

- Sasaoka et al generally teaches in paragraph [0025] that the length of the sealed portions is made sufficiently small so as to reduce spreading of light and to minimize a harmful effect on light transmission even when the Bragg reflection condition is not satisfied at the sealed portions, but fails to provide or fairly suggest a sealed portion length range having the desired stated qualities expeditiously without undue experimentation.
- Further, Sasaoka et al fails to suggest a length of the sealed fiber optic end for the case in which a condenser or the light source is optically connected to the sealed end.
- While Muta et al (JP 05-288967, raw machine English-language translation provided) teaches a light guide rod connected to a fiber, it fails to teach a condenser (if the light guide rod is to be taken as the sealed end portion), photonic crystal fiber, a cladding having a plurality of holes, or a sealed end portion (if the light guide rod is to be taken as the condenser) of the fiber.
- While Muta et al teaches formula (see figure 3) for determining the length of the light guide rod, Muta et al fails to teach the formula for the length of the sealed end portion of the photonic crystal fiber that is coupled to either a laser or a condenser.

- In the formula (see figure 3) of Muta et al, it fails to take into consideration the distance between the laser and the sealed end portion "d".
- While Shiraishi et al (JP 08-220378) teaches a laser coupled via a lens to a fiber, it fails to teach the fiber having a solid core or the fiber having a sealed end portion or the sealed portion having a length. Further it is silent to the clad of the fiber having a plurality of holes.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quyen P. Leung whose telephone number is (571) 272-8188. The examiner can normally be reached on normally M-F, 6:15 am - 2:45 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on (571) 272-2344. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2874

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Quyen Leung
Primary Patent Examiner
Group Art Unit 2874

qpl